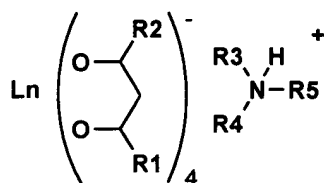


5 I claim:

1. A combinatorial library comprising triboluminescent compounds of the structure:



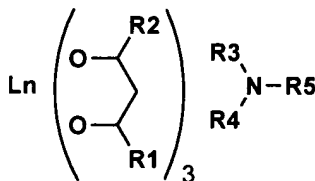
wherein

R1=C(CH₃)₃, *t*-butyl, R2=phenyl, amine = N-ethylpyridine, Ln = Gd;

R1=R2=phenyl, amine = N-ethylpyridine, Ln = Dy;

R1=R2=phenyl, amine =dimethylbenzylamine, Ln = Dy.

2. A combinatorial library comprising triboluminescent compounds of the structure:



5 wherein

R1=R2=phenyl, amine = N-ethylpyridine, Ln = Gd;

R1=R2=phenyl, amine = dimethylbenzylamine, Ln = Gd;

R1=trifluoromethyl, R2=2-thienyl, amine = N-ethylpyridine, Ln = Gd;

R1=R2=phenyl, amine = N-ethylpyridine, Ln = Dy;

10 R1=trifluoromethyl, R2=2-thienyl, amine = 4-dimethylaminopyridine, Ln = Dy.

3. A method for synthesizing and screening a combinatorial library comprising the steps

of:

combining a diketone reagent, an amine reagent and a lanthanide salt reagent in a reaction

15 vessel;

generating an array of said reaction vessels wherein said reagents differ from one reaction

vessel to the next within said array according to a pre-determined variable parameter;

purifying and isolating a reaction product synthesized from a chemical reaction of said
reagents in each of said reaction vessels,

20 testing said reaction products in each of said reaction vessels for evidence of
photoluminescence;

mechanically testing said reaction products in each of said reaction vessels for visual
evidence of triboluminescence; and

generating an organized grid of distinct reaction products differing according to said
25 variable parameter, said reaction products providing a visual display of the relative
triboluminescence of each of said reaction products.

5 4. The method according to claim 3, wherein said variable parameter comprises varying the identity of said lanthanide salt reagent selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu.

10 5. The method according to claim 3, wherein said variable parameter comprises varying the identity of said amine reagent.

15 6. The method according to claim 3, wherein said variable parameter comprises varying the identity of said diketone reagent.

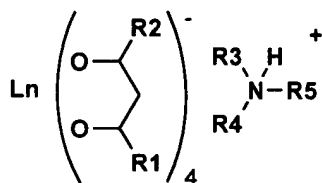
20 7. The method according to claim 3, wherein said variable parameter comprises varying a molar ratio of said diketone, amine and lanthanide salt reagents.

25 8. The method according to claim 7, wherein said molar ratio of the diketone, amine and lanthanide salt reagents is a 4:4:1 molar ratio.

 9. The method according to claim 7, wherein said molar ratio of the diketone, amine and lanthanide salt reagents is a 3:4:1 molar ratio.

 10. A tribolumescent compound of the structure:

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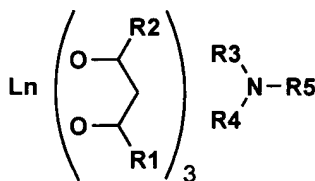
wherein

R1=C(CH₃)₃, *t*-butyl, R2=phenyl, amine = N-ethylpyridine, Ln = Gd;

R1=R2=phenyl, amine = N-ethylpyridine, Ln = Dy;

R1=R2=phenyl, amine =dimethylbenzylamine, Ln = Dy.

11. A tribolumenscent compound of the structure:



wherein

R1=R2=phenyl, amine = N-ethylpyridine, Ln = Gd;

R1=R2=phenyl, amine = dimethylbenzylamine, Ln = Gd;

R1=trifluoromethyl, R2=2-thienyl, amine = N-ethylpyridine, Ln = Gd;

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5 R1=R2=phenyl, amine = N-ethylpyridine, Ln = Dy;

R1=trifluoromethyl, R2=2-thienyl, amine = 4-dimethylaminopyridine, Ln = Dy.

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